



Course Description

SON2618C | Acoustical Physics and Instrumentation 2 | 2.00 credits

Physical Principles of Ultrasound Instrumentation: This course is designed to familiarize the student with the physical principles and modes of operation of diagnostic ultrasound equipment. Subject matter includes transducers, display systems, component parts of a scanning system, real-time scanners, Doppler equipment, quality control, routine maintenance, and recent developments. Prerequisites: SON2614C, CGS1060.

Course Competencies

Competency 1: The student will demonstrate knowledge and comprehension of the properties of sound by:

1. Listing different acoustic variables
2. Defining, and differentiating different acoustic variables
3. Reviewing and discussing competencies of basic sonography

Competency 2: The student will demonstrate knowledge and comprehension of sound beams by:

1. Identifying and describing the components of a sound beam
2. Differentiating between Near Zone and Far zone
3. Discussing Focal Depth
4. Explaining sound beam divergence
5. Defining types of waves
6. Explaining Huygen's Principle
7. Explaining lateral resolution, its units, and by what it is determined
8. Discussing focusing
9. Differentiating types of focusing

Competency 3: The student will demonstrate knowledge and comprehension about resolution by:

1. Explaining axial resolution and lateral resolution
2. Demonstrating how the controls can improve axial resolution
3. Explaining the association with frequency, pulse duration, pulse length and resolution

Competency 4: The student will demonstrate knowledge and comprehension of Intensity by:

1. Defining intensity
2. Defining spatial peak intensity
3. Defining temporal peak intensity
4. Combining spatial and temporal factors. Explaining the measurement methods of intensity
5. Explain the intensity and relate this to the bioeffects of diagnostic ultrasound

Competency 5: The student will demonstrate knowledge of bioeffects by:

1. Review AIUM guidelines and statements about bioeffects
2. Discussing the difference between therapeutic ultrasound and diagnostic ultrasound
3. Describing sound energy conversion into heat
4. Discussing study techniques of bioeffects
5. Listing and defining the mechanisms of bioeffects
6. Discussing overall safety considerations in diagnostic medical sonography

Learning Outcomes:

- Solve problems using critical and creative thinking and scientific reasoning